

CLAIMS

What is claimed is:

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1. A method of electrically connecting a semiconductor die to a substrate, comprising:
providing a semiconductor die having a surface having a plurality of bond pads thereon;
providing a substrate having a die side surface, a second attachment surface, at least one via extending through the board from the die side surface to the second attachment surface, a plurality of circuits, and a plurality of bond pads located on the second attachment surface of the board;
10 attaching the surface having a plurality of bond pads thereon of the semiconductor die to the die side surface of said board; and
connecting said plurality of bond pads of the semiconductor die to said plurality of bond pads of said board using a plurality of wire bonds, said plurality of wire bonds extending through said at least one via extending through said board
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2. The method of claim 1, further comprising:
applying an adhesive to a portion of the die side of the substrate to attach the semiconductor die thereto.
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3. The method of claim 1, further comprising:
filling at least a portion of the via in the substrate with a sealant.
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4. The method of claim 1, further comprising:
filling the via in the substrate with a sealant.
5. A method of electrically connecting a semiconductor die to a master board, comprising:
providing a semiconductor die having a plurality of bond pads thereon;
providing a master board having a plurality of circuit traces thereon;

providing a board having a die side surface, a second attachment surface, at least one via extending through the board from the die side surface to the second attachment surface, a plurality of circuits, and a plurality of bond pads located on the second attachment surface of the board;

5 providing a plurality of electrical connectors for connecting the plurality of bond pads located on the second attachment surface of the board to the circuit traces of the master board;

attaching said semiconductor die to a portion of the die side surface of the board;

10 connecting said plurality of bond pads of said semiconductor die to said plurality of bond pads of said board using a plurality of wire bonds, said plurality of wire bonds extending through the at least one via extending through the board; and connecting said board and master board using said plurality of electrical connectors on said board to said plurality of circuit traces on said master board.

15 6. The method of claim 5, wherein the board includes a plurality of vias extending therethrough.

20 7. The method of claim 5, wherein the plurality of electrical connectors comprise solder balls.

25 8. A method of electrically connecting at least two semiconductor die to a substrate, comprising:
providing at least two semiconductor die, each semiconductor die having a surface having a plurality of bond pads thereon;
providing a substrate having a die side surface, a second attachment surface, at least two vias extending through the board from the die side surface to the second attachment surface, a plurality of circuits, and a plurality of bond pads located on the second attachment surface of the board;

attaching the surface having a plurality of bond pads thereon of a semiconductor die of the at least two semiconductor die to the die side surface of the board having the plurality of bond pads of the semiconductor die located over one of the at least two vias extending through the board ; and

5 connecting said plurality of bond pads of the semiconductor die to said plurality of bond pads of said board using a plurality of wire bonds, said plurality of wire bonds extending through the one via extending through the board of the at least two vias extending through the board.

10 9. The method of claim 8, further comprising:
applying an adhesive to a portion of the die side of the substrate to attach each semiconductor die thereto.

15 10. The method of claim 8, further comprising:
filling at least a portion of each via in the substrate with a sealant.

11. The method of claim 8, further comprising:
filling each via in the substrate with a sealant.

20 12. A method of electrically connecting a plurality of semiconductor die to a master board, comprising:
providing a plurality of semiconductor die, each semiconductor die having a plurality of bond pads thereon;
providing a master board having a plurality of circuit traces thereon;
25 providing a board having a die side surface, a second attachment surface, a plurality of vias extending through the board from the die side surface to the second attachment surface, a plurality of circuits, and a plurality of bond pads located on the second attachment surface of the board;

providing a plurality of electrical connectors for connecting the plurality of bond pads located on the second attachment surface of the board to the circuit traces of the master board;

attaching each semiconductor die of the plurality of semiconductor die to a portion of the die side surface of the board;

connecting said plurality of bond pads of each semiconductor die to said plurality of bond pads of said board using a plurality of wire bonds, said plurality of wire bonds extending through the a via extending through then board; and

connecting said board and master board using said plurality of electrical connectors on said board to said plurality of circuit traces on said master board.

13. The method of claim 12, wherein the plurality of electrical connectors comprise solder balls.

14. The method of claim 12, wherein the plurality of electrical connectors comprise pins.

15. The method of claim 12, further comprising:
filling at least a portion of each via in the board with a sealant.

16. The method of claim 12, further comprising:
filling each via in the board with a sealant.

17. A method of electrically connecting a semiconductor die to a master board, comprising:
providing a semiconductor die having a plurality of bond pads thereon;
providing a master board having a plurality of circuit traces thereon;
providing a board having a die side surface, a second attachment surface, at least one via extending through the board from the die side surface to the second attachment

surface, a plurality of circuits, and a plurality of bond pads located on the die side surface of the board;
providing a plurality of electrical connectors for connecting the plurality of bond pads located on the die side surface of the board to the circuit traces of the master board;
5 board;
attaching said semiconductor die to a portion of the die side surface of the board;
connecting said plurality of bond pads of said semiconductor die to said plurality of bond pads of said board using a plurality of wire bonds, said plurality of wire bonds extending through the at least one via extending through then board; and
10 connecting said board and master board using said plurality of electrical connectors on said board to said plurality of circuit traces on said master board.

18. The method of claim 17, wherein the board includes a plurality of vias extending therethrough.

19. The method of claim 17, wherein the plurality of electrical connectors comprise wire bonds.

20. A method of electrically connecting a plurality of semiconductor die to a master board, comprising:
providing a plurality of semiconductor die, each semiconductor die having a plurality of bond pads thereon;
providing a master board having a plurality of circuit traces thereon;
providing a board having a die side surface, a second attachment surface, a plurality of vias extending through the board from the die side surface to the second attachment surface, a plurality of circuits, and a plurality of bond pads located on the die side surface of the board;

providing a plurality of electrical connectors for connecting the plurality of bond pads located on the second attachment surface of the board to the circuit traces of the master board;

attaching each semiconductor die of the plurality of semiconductor die to a portion of the die side surface of the board;

connecting said plurality of bond pads of each semiconductor die to said plurality of bond pads of said board using a plurality of wire bonds, said plurality of wire bonds extending through the a via extending through then board; and

connecting said board and master board using said plurality of electrical connectors on said board to said plurality of circuit traces on said master board.

21. The method of claim 20, wherein the plurality of electrical connectors comprise wire bonds.

22. The method of claim 20, wherein the plurality of electrical connectors comprise pins.

23. The method of claim 20, further comprising:
filling at least a portion of each via in the board with a sealant.

24. The method of claim 20, further comprising:
filling each via in the board with a sealant.

25. The method of claim 20, further comprising:
applying an adhesive to a portion of the die side surface to attach each semiconductor die thereto.

26. A method of attaching a semiconductor die to a substrate, comprising:
providing a semiconductor die having a surface having at least one bond pads thereon;

providing a substrate having a die side surface, a second attachment surface, at least one via extending through the board from the die side surface to the second attachment surface, a plurality of circuits, and at least one bond pad located on the second attachment surface of the board;

5 attaching the surface having at least one bond pad thereon of the semiconductor die to the die side surface of said board; and

connecting said at least one bond pad of the semiconductor die to said at least one bond pad of said board using at least one wire bond, said at least one wire bond extending through said at least one via extending through said board

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27. The method of claim 26, further comprising:
applying an adhesive to a portion of the die side of the substrate to attach the semiconductor die thereto.

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28. The method of claim 26, further comprising:
filling at least a portion of the via in the substrate with a sealant.

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29. The method of claim 26, further comprising:
filling the via in the substrate with a sealant.

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30. A method of attaching a semiconductor die to a master board, comprising:
providing a semiconductor die having at least one bond pad thereon;
providing a master board having at least one circuit trace thereon;
providing a board having a die side surface, a second attachment surface, at least one via extending through the board from the die side surface to the second attachment surface, at least one circuit, and at least one bond pad located on the second attachment surface of the board;

providing at least one electrical connector for connecting the at least one bond pad located on the second attachment surface of the board to the at least one circuit trace of the master board;

attaching said semiconductor die to a portion of the die side surface of the board;

5 connecting said at least one bond pad of said semiconductor die to said at least one bond pad of said board using at least one wire bond, said at least one wire bond extending through the at least one via extending through then board; and connecting said board and master board using said at least one electrical connector on said board to said at least one circuit trace on said master board.

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31. The method of claim 30, wherein the board includes a plurality of vias extending therethrough.

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32. The method of claim 30, wherein the at least one electrical connector comprises at least one solder ball.

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33. A method of attaching at least two semiconductor die to a substrate, comprising:

providing at least two semiconductor die, each semiconductor die having a surface having at least one bond pad thereon;

providing a substrate having a die side surface, a second attachment surface, at least two vias extending through the board from the die side surface to the second attachment surface, at least two circuits, and at least two bond pads located on the second attachment surface of the board;

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attaching the surface having at least one bond pad thereon of a semiconductor die of the at least two semiconductor die to the die side surface of the board having the at least one bond pad of the semiconductor die located over one of the at least two vias extending through the board ; and

connecting said at least one of each of the semiconductor die to said at least two bond pads of said board using at least two wire bonds, at least one wire bond of said at least two wire bonds extending through the one via extending through the board of the at least two vias extending through the board.

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34. The method of claim 33, further comprising:
applying an adhesive to a portion of the die side of the substrate to attach each semiconductor die thereto.

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35. The method of claim 33, further comprising:
filling at least a portion of each via in the substrate with a sealant.

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36. The method of claim 33, further comprising:
filling each via in the substrate with a sealant.

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37. A method of attaching a plurality of semiconductor die to a master board, comprising:
providing a plurality of semiconductor die, each semiconductor die having at least one bond pad thereon;
providing a master board having a plurality of circuit traces thereon;
providing a board having a die side surface, a second attachment surface, a plurality of vias extending through the board from the die side surface to the second attachment surface, a plurality of circuits, and a plurality of bond pads located on the second attachment surface of the board;
providing a plurality of electrical connectors for connecting the plurality of bond pads located on the second attachment surface of the board to the circuit traces of the master board;
attaching each semiconductor die of the plurality of semiconductor die to a portion of the die side surface of the board;

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connecting said at least one bond pad of each semiconductor die to said plurality of bond pads of said board using a plurality of wire bonds, said plurality of wire bonds extending through the plurality of vias extending through then board; and connecting said board and master board using said plurality of electrical connectors on
5 said board to said plurality of circuit traces on said master board.

38. The method of claim 37, wherein the plurality of electrical connectors comprise solder balls.

10 39. The method of claim 37, wherein the plurality of electrical connectors comprise pins.

40. The method of claim 37, further comprising:
filling at least a portion of each via in the board with a sealant.

15 41. The method of claim 37, further comprising:
filling each via in the board with a sealant.

20 42. A method of attaching a semiconductor die to a master board, comprising:
providing a semiconductor die having at least one bond pad thereon;
providing a master board having at least one circuit trace thereon;
providing a board having a die side surface, a second attachment surface, at least one via
extending through the board from the die side surface to the second attachment
surface, at least one circuit, and at least one bond pad located on the die side
25 surface of the board;
providing at least one electrical connector for connecting the at least one bond pad
located on the die side surface of the board to the at least one circuit trace of the
master board;
attaching said semiconductor die to a portion of the die side surface of the board;

connecting said at least one bond pad of said semiconductor die to said at least one bond pads of said board using at least one wire bond, said at least one wire bond extending through the at least one via extending through then board; and connecting said board and master board using said at least one electrical connector on said board to said at least one circuit trace on said master board.

43. The method of claim 42, wherein the board includes a plurality of vias extending therethrough.

44. The method of claim 42, wherein the at least one electrical connector comprises at least one wire bond.

45. A method of attaching a plurality of semiconductor die to a master board, comprising:

providing a plurality of semiconductor die, each semiconductor die having at least one bond pad thereon;

providing a master board having a plurality of circuit traces thereon;

providing a board having a die side surface, a second attachment surface, a plurality of vias extending through the board from the die side surface to the second

attachment surface, a plurality of circuits, and a plurality of bond pads located on the die side surface of the board;

providing a plurality of electrical connectors for connecting the plurality of bond pads located on the second attachment surface of the board to the circuit traces of the master board;

attaching each semiconductor die of the plurality of semiconductor die to a portion of the die side surface of the board;

connecting said at least one bond pad of each semiconductor die to said plurality of bond pads of said board using a plurality of wire bonds, at least one wire bond of said

plurality of wire bonds extending through at least one via of the plurality of vias
extending through then board; and
connecting said board and master board using said plurality of electrical connectors on
said board to said plurality of circuit traces on said master board.

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46. The method of claim 45, wherein the plurality of electrical connectors
comprise wire bonds.

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47. The method of claim 45, wherein the plurality of electrical connectors
comprise pins.

48. The method of claim 45, further comprising:
filling at least a portion of each via in the board with a sealant.

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49. The method of claim 45, further comprising:
filling each via in the board with a sealant.

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50. The method of claim 45, further comprising:
applying an adhesive to a portion of the die side surface to attach each semiconductor die
thereto.